

NOTE

New Data on the Structure of the Female Genitalia of
Flea Beetles (Coleoptera: Chrysomelidae)

Female genitalia of flea beetles have received much attention during last two decades and have become an important source of valuable diagnostic and phylogenetic characters (Cox 1997; Doguet 1994; Duckett 1999; Kangas and Rutanen 1993; Konstantinov 1987, 1998a, 1998c; Konstantinov and Vandenberg 1996; Lingafelter and Konstantinov 2000). They also became a subject of comparative morphological studies (Duckett 1995; Konstantinov 1994, 1998b; Konstantinov and Rusakov 1993). As a result of these studies the structure and variability of the spermatheca, vaginal palpi and tignum are relatively well understood, however the relative position of these structures, especially in regards to the gut, tergite 9 and vagina, and the way in which they are connected to each other remained unknown.

This note intends to answer the aforementioned questions. In addition to standard dissecting techniques (Konstantinov 1998c, Lingafelter and Konstantinov 2000), "Chlorazol Black" was used to stain the membranes of the genitalia. That procedure revealed that each sclerite (tergite and sternite) consists of two membranous layers (Figs. 1A, B): an external layer (Fig. 1B thicker lines) usually more sclerotized in both tergites and sternites; and an internal layer usually much less sclerotized and fully membranous (Fig. 1B thinner lines). This latter layer usually is very poorly visible without staining. In tergites the external, dorsal layer is more sclerotized than the ventral one, whereas in sternites ventral layer is external and more sclerotized than the internal, dorsal layer. The ventral layer of sternite 8 also contains a long sclerotized projection called the tignum. The internal membranous layer connects the distal part

of the more external sclerite with the proximal part of the following sclerite, thus enabling the genitalia to protrude telescopically out of the abdomen. The maximum distance to which genitalia can be protruded depends upon the length of the internal layers of segment 7, the external and internal layers of segments 8 and 9, and the distance between the base of the vaginal palpi and apex of tergite 9. The internal layer of tergite 8 forms at least the dorsal side of the gut. It also connects with the dorsal layer of tergite 9 which is situated only slightly below the dorsal side of the gut and which lateral sclerotizations are situated laterally of anus. The internal membrane of tergite 9 also extends into the ventral and lateral walls of the gut. The membranous ventral wall of the gut bends anteriorly and continues on the dorsal side of the vagina. The vaginal palpi are formed by the invagination of the dorsal side of the vagina, so their cavity opens in the body cavity. The ventral side of the vagina is a continuation of the internal layer of sternite 8. In addition the external and internal layers of tergite and sternite 8 are laterally connected to each other. The connections of the internal layers of segment 8 form lateral folds which continue on the side of the vagina.

This observation yields the rather unexpected result that the vagina is formed by membranous parts of both segments 8 and 9. In order to avoid this interpretation, we would have to assume that tergite 9 is absent in flea beetles and everything between the external layer of tergite 8 and the vagina belongs to the internal layer of tergite 8. Although this latter explanation is the most parsimonious it should be tested by embryological or comparative morphological studies. Until then the question of the ho-

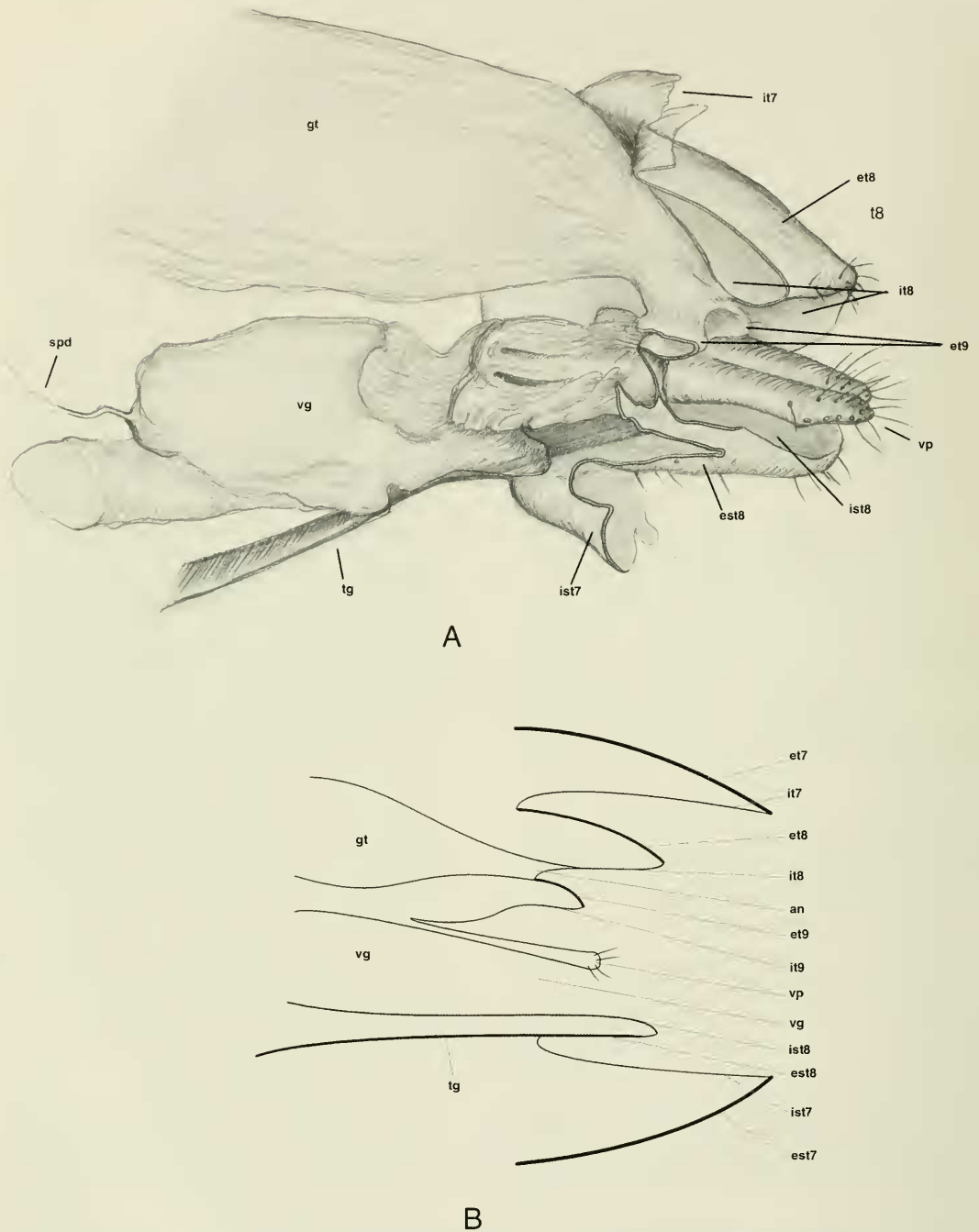


Fig. 1. Female genitalia of *Pseudodera xanthospila* Baly. A, Three dimensional drawing with right side of several sclerites removed. B, Diagrammatic sagittal section. Abbreviations: an = anus; est7 = external layer of sternite 7; est8 = external layer of sternite 8; et7 = external layer of tergite 7; et8 = external layer of tergite 8; et9 = external layer of tergite 9; ist7 = internal layer of sternite 7; ist8 = internal layer of sternite 8; it7 = internal layer of tergite 7; it8 = internal layer of tergite 8; it9 = internal layer of tergite 9; gt = gut; spd = spermathecal duct; tg = tignum; vg = vagina; vp = vaginal palpus.

mology of the vaginal palpi remains unanswered.

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